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OPERATIONAL ASSESSMENT—THE ACHILLES HEEL OF EFFECTS-BASED OPERATIONS?

By

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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15.Abstract: With the promise of war-winning efficiency, the effects-based operations (EBO) concept has rightly become the subject of intense joint study. For all this enthusiasm, however, operational commanders ultimately require more than the highly-theoretical EBO concepts. They also require a method of assessing, during a campaign's execution, whether or not the more sophisticated EBO approach is working. Unfortunately, the current ability to assess the success or failure of an effects-based campaign is far less mature than the EBO concept--this "assessment gap," then, prevents commanders from fully embracing EBO.

This analysis suggests that assessing effects in war has never been possible with the clarity a commander desires; it is unlikely the current joint focus on technological solutions will succeed in creating this clarity in the future. Instead, overcoming this assessment "shortcoming" can and must begin with operational commanders and their staffs. Operational commanders must begin to leverage EBO's potential now by designing campaigns that account for both the capabilities and limitations of the operational assessment process.

This paper supports such an effort by developing a new framework for operational assessment--one that focuses on the decision making needs of the operational commander. Following these recommendations might just allow future JFCs to design potent EBO campaigns, regardless of the ever-present uncertainty; ignoring these recommendations, on the other hand, will likely allow assessment to remain the Achilles heel of EBO.

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With the promise of war-winning efficiency, the effects-based operations (EBO) concept has rightly become the subject of intense joint study. For all this enthusiasm, however, operational commanders ultimately require more than the highly-theoretical EBO concepts. They also require a method of assessing, during a campaign's execution, whether or not the more sophisticated EBO approach is working. Unfortunately, the current ability to assess the success or failure of an effects-based campaign is far less mature than the EBO concept—this "assessment gap," then, prevents commanders from fully embracing EBO.

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This paper supports such an effort by developing a new framework for operational assessment—one that focuses on the decision-making needs of the operational commander. Following these recommendations will allow future JFCs to design potent EBO campaigns, regardless of the ever-present uncertainty; ignoring these recommendations, on the other hand, will likely mean that assessment remains the Achilles heel of EBO.

We couldn't afford distorted assessments: too much optimism could prompt us to launch the ground war too soon, at the cost of many lives; too much pessimism could cause us to sit wringing our hands and moaning that the enemy was still too strong.[1]

General Norman Schwarzkopf

One of the greatest challenges facing airmen remains that of assessment: how do we know if we are achieving our objectives? The problem has haunted airmen for decades, but seems little closer to solution than it was in World War II.[2]

Philip S. Meilinger

Joint Force Commanders (JFCs) design military campaigns, in concert with diplomatic, economic, and informational efforts, to meet the nation's strategic goals. In so doing, these commanders make judgments about both military objectives and the best method of achieving those objectives. None of this is new. What is new, however, are the expanded operational capabilities and concepts available to JFCs in the pursuit of the campaign's objectives. Today, the technological superiority of U.S. military forces, particularly in information systems, maneuver, precision and standoff weapons, and stealth capability, makes the adversary's national political, economic, informational, and military systems potentially vulnerable to lethal or non-lethal attack from the onset of hostilities. Thus, military commanders may achieve physical, functional, or psychological effects by methods never before available—at least, never available so early in a campaign or at such a low attritional cost for US, allied, or coalition forces. By attaining these desired effects, commanders may rapidly reduce, or completely eliminate, the adversary's ability or will to resist US, allied, or coalition demands, greatly shortening the conflict's duration. Developing and enhancing such methods is the focus of the effects-based operations (EBO) concept.

With the promise of war-winning efficiency, the EBO concept has rightly become the subject of intense joint study. For all this enthusiasm, however, operational commanders

[1] Norman Schwarzkopf, It Doesn't Take a Hero (New York: Linda Grey Bantam Books 1992), 432.
[2] Philip S. Meilinger, "The Future of Air Power: Observations from the Past Decade," Air Power Review, 3 (Spring 2000): 64.

ultimately require more than the highly-theoretical EBO concepts. They also require a method of assessing, during a campaign's execution, whether or not the more sophisticated EBO approach is working. Unfortunately, the current ability to assess the success or failure of an effects-based operation is far less mature than the EBO concept. In part, one can easily understand this assessment void since the causal relationship between military action and effect is often indirect and ambiguous.[3] Still, the inherent difficulty in assessment cannot adequately explain why those charged with assessing effects, even in recent operations like DESERT STORM and ALLIED FORCE, were untrained and apparently incapable of attempting such assessments.[4] Given this paucity of assessment capability and, even more damning, the complete absence of an intellectual framework for the assessment process, JFCs remain only reluctant advocates of EBO—they tend to rely proportionately more on physical effects and distrust functional or psychological effects. Operational commanders perceive physical effects as measurable and objective—and hence, meaningful; functional or psychological effects are much less tangible—they are largely de-emphasized except in cases of abundant military resources. As a result, commanders miss opportunities to design the most efficacious military campaign. Is this "assessment gap" the Achilles heel of EBO?

Fundamentally, this analysis suggests that assessing effects in war has never been possible with the degree of clarity a commander desires; it is unlikely the current joint focus on technology, speed of information flow, maneuver, doctrine, and organizations will succeed in creating this clarity in the future—even for physical effects.[5] Instead, overcoming this

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[3] Paul K. Davis, Effects-Based Operations: A Grand Challenge for the Analytical Community (Santa Monica: Rand 2001), 26.
[4] T.W. Beagle, Jr. Effects-Based Targeting: Another Empty Promise? (Maxwell AFB, AL: Air University Press Dec 2001), 89.
[5] For example, one may judge the current military focus by looking at the on-going Joint Battle Damage Assessment Joint Test and Evaluation effort. The focus is clearly on a technological solution. This paper

assessment "shortcoming" can and must begin with operational commanders and their staffs. *Operational commanders must begin to leverage EBO's potential now by designing campaigns that account for both the capabilities and limitations of the operational assessment process*. In developing this premise, then, the discussion first begins with key definitions, foundational concepts, and assumptions. Second, the paper directly demonstrates the enduring challenge of the assessment process—it is not an EBO phenomenon, makes clear these challenges are unlikely to disappear—regardless of technological efforts, and highlights specific considerations for operational commanders and their staffs. Finally, it offers recommendations for operational commanders on how to successfully bridge the perceived assessment gap with innovative campaign design.

Definitions, Foundational Concepts, and Assumptions

At the leading edge of the EBO debate is the J9 Concepts Department of US Joint Forces Command (USJFCOM). In that context, this discussion will favor USJFCOM J9 definitions. An *effect*, then, *"is the physical, functional, or psychological outcome, event, or consequence that results from specific military or nonmilitary actions."*[6] J9 defines *EBO* as *"a process for obtaining a desired strategic outcome or effect on the enemy through the synergistic and cumulative application of the full range of military and nonmilitary capabilities at all levels of conflict."*[7] Significantly, one must understand that both definitions—effect and EBO—include consideration of physical destruction and attrition as valid effects in war. Fully leveraging the EBO concept may indeed strive to mitigate

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suggests that while these efforts are worthwhile, most effort should first be spent on an intellectual decision framework for the operational commander.

[6] Joint Forces Command J9 Concepts Department, A Concept Framework for Effects-based Operations White Paper Version 1.0, 18 Oct 2001, ii. Beagle's work, cited above, highlights that multiple "effects taxonomies" are used in the EBO debate today. However, the author finds JFCOM J9's approach—the physical, functional, and psychological taxonomy—most clear and useful. For full discussion of other taxonomies, see Beagle, pages 5-8.

[7] Ibid.

destruction and attrition; however, the concept in no way suggests that destruction and attrition are no longer useful mechanisms in war. Thus, "EBO should be considered an expansion of, not a substitute for, operations that involve attrition, destruction, and occupation."[8]

Joint Publication 3-0 (JP 3-0), *Doctrine for Joint Operations*, defines *combat assessment* as *"the determination of the overall effectiveness of force employment during military operations."*[9] It is useful here to distinguish between combat assessment in *theory* and *practice.* Despite the implied operational, even strategic, focus in JP 3-0's definition of combat assessment, analysis of any modern conflict demonstrates that combat assessment in practice operates with a decidedly tactical character.[10] Additionally, JP 3-0 falls short in its assessment emphasis by not identifying combat assessment as an important consideration at the *outset* of combat—assessment receives emphasis only as a consideration for *sustained* combat operations.[11] Joint doctrine's inappropriate treatment of combat assessment explains why a new doctrinal concept is necessary.

Operational assessment is best defined as *the art and science of enhancing the operational commander's judgment and decisions about the military campaign's effectiveness and attendant risk in progressing toward the military endstate.* Such an "operational

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[8] Davis, 15.
[9] Joint Chiefs of Staff, Doctrine for Joint Operations, Joint Publication 3-0 (Washington, DC: 10 Sep 2001), IV-17.
[10] Department of the Air Force, Aerospace Commander's Handbook for the JFACC, AFDCH 10-01 (Maxwell AFB, AL: 27 June 2001), 68. It is most interesting that a guide for future JFACCs should so clearly admit the "tactical nature" of combat assessment. Such an admission is counter to airpower's traditional desire to rapidly achieve operational and strategic effects. JP 3-0's expanded definitions of combat assessment and battle damage assessment also point to a tactical focus. Specifically, JP 3-0's glossary describes combat assessment as being "composed of three major components: battle damage assessment, munitions effects assessment, and reattack recommendations." In turn, battle damage assessment is defined as "the timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective."
[11] Chapter IV of JP 3-0, Doctrine for Joint Operations, fails to emphasize combat assessment as a consideration "before combat" or "at the outset of combat." Instead, combat assessment is highlighted only during "sustained combat operations."

assessment" concept improves over the "combat assessment" approach in three important ways. First, the new approach explicitly directs assessment efforts to evaluate, both objectively and subjectively, the campaign's ability to effectively link military efforts and endstate—that is, operational assessment assesses the commander's "method" in prosecuting the war. Second, this definition appropriately highlights the inextricable relationship between effectiveness and risk. Third, and most importantly, the new doctrinal definition orients the assessment process on the operational commander and his decision-making requirements.[12]

As a final foundational concept, this paper recognizes the intangible, but vital role of operational art in the development and execution of campaigns. While total mastery of operational art is a product of both natural ability—coup d'oeil—and hard work, effective campaign design can be guided by five key considerations as outlined in JP 3-0—ends, ways, means, risk, and the military exit strategy.[13] Perhaps, as this paper will suggest, this list lacks completeness; it does, however, provide a useful framework for the operational commander.

Four key assumptions underpin this analysis.[14] First, Clausewitzian concepts of uncertainty and interaction in war remain exceedingly relevant. Thus, any pragmatic approach to operational assessment and campaign design requires a focus on *bounding* uncertainty, not eliminating it. Second, the EBO concept applies broadly, across all instruments of national power—this paper, however, addresses only the military instrument.

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[12] Some may criticize this approach by suggesting the current Commander's Critical Information Requirements or CCIRs satisfy the operational commander's decision-making needs, enabling him to properly anticipate the enemy and future campaign direction. The author argues throughout this text that such a view ignores recent history.

[13] Joint Publication 3-0, II-3. Specifically, JP 3-0 lists the five questions as follows: (1) what military (or related political and social) conditions must be produced in the operational area to achieve the strategic goal? (ends); (2) what sequence of actions is most likely to produce that condition? (ways); (3) How should the resources of the joint force be applied to accomplish that sequence of actions? (means); (4) what is the likely cost or risk to the joint force in performing that sequence of actions?; and (5) what resources must be committed or actions performed to successfully execute the JFC's exit strategy?

Third, designing the ideal EBO campaign involves more than assessment refinements; it also requires a heightened knowledge base of the adversary, further exploitation of adversary systems, and enhanced human intelligence capability, to name only a few requirements. These requirements represent fruitful opportunities for additional research, but are beyond the necessarily-constrained scope of this paper. Finally, institutionalizing EBO campaign design will involve initiatives with doctrine, training, and technology. This paper, however, focuses on the best starting point for this institutionalization—operational commanders and their staffs. Of note, this paper's approach assumes reader familiarity with effects-based thinking and the historical case studies used herein; the paper, nevertheless, includes extensive explanatory notes. With these assumptions established, then, it is believed that sufficient foundation exists to analyze the enduring challenges in the assessment process.

Enduring Challenge of Operational Assessment

Commanders make their own independent, and sometimes intuitive, assessment of how they intend to win.[15]
US Army Field Manual 3-0

Despite an increasingly capable military force and a more sophisticated EBO concept, commanders must still practice operational art in an uncertain environment. In the past, to minimize this uncertainty, commanders used operational intelligence and study to gain a knowledge advantage over the adversary. Similarly, commanders welcomed new operational methods to exploit this knowledge and facilitate rapidly winning the nation's wars. However, commanders have traditionally not been able to assess the efficacy of these new methods with any degree of certainty. Ultimately, decisions about a campaign's direction or current level of risk depended as much upon the commander's judgment as any formal, objective assessment

[14] Assumptions, herein, allow this paper's narrow focus while simultaneously acknowledging the inherent complexity of effects-based operations, assessment, and campaign design. These assumptions are not intended to mask significant issues—instead, the assumptions represent valid starting points for this discussion.

process. In other words, an effects-based construct is not particularly new—neither is the challenge of assessment. One can clearly understand the enduring nature of the assessment challenge by examining some modern historical examples.[16]

Two examples from World War II are particularly revealing—an airpower case and a ground force case. For the airpower example, this analysis concentrates on the Combined Bomber Offensive (CBO). At the 1943 Casablanca Conference, the defeat of the German Luftwaffe became the CBO's "intermediate objective second to none in priority"—and air superiority became the first step toward paving the way for the Normandy invasion.[17] Just how the CBO planners chose to achieve air superiority reveals much about EBO and the operational assessment challenge. First, planners selected the ball-bearing industry as the focus of strategic bombing efforts. Such a target set was attractive to planners not only because its destruction would prevent aircraft production and hamper war-making capability in general, but also because it was a small, concentrated, high-payoff target set. Indeed, post-war interviews with Albert Speer, the German Minister of Munitions, indicated the correctness of the ball-bearing target set: "armaments production would have been critically weakened after two months and after four months would have been brought completely to a standstill."[18] These raids, however, proved prohibitively costly and ineffective. Air planners next shifted their sights to the German aircraft production plants. Again, this method was unsuccessful in eliminating the German air threat. Instead, Germany actually increased

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[15] Department of the Army, Operations, US Army Field Manual 3-0 (14 June 2001), 5-14.
[16] Vignette discussions assume a basic knowledge of American war experience since World War II. In each case, however, footnotes will provide recommendations for further reading useful to both the novice and one interested in a more in-depth treatment.
[17] Stephen L. McFarland and Wesley Phillips Newton, To Command the Sky, (Washington DC: Smithsonian Institution Press, 1991), 94.
[18] Haywood S. Hansell, Jr., The Strategic Air War Against Germany and Japan, (Washington DC: Office of Air Force History, 1986), 86.

fighter production, achieving peak production in the summer of 1944.[19] Ultimately, the Allies gained the "air superiority" effect through attrition battles in the air. But, it was not the attrition of aircraft that mattered; instead, it was the attrition of trained, experienced pilots.[20]

What lessons from this historical case, then, remain relevant? First, correct knowledge about how to achieve the desired effect, like the ball-bearing targeting during the CBO, is always a wholly insufficient condition for success. The target set must also be viable and vulnerable—viable such that mission accomplishment remains within acceptable risk levels and vulnerable such that available weapons are capable of achieving the desired effect against the target. Second, effects-based planning invariably involves assumptions. As World War II air planners redirected bomber efforts toward the aircraft industry, actual results fell far short of expectations. In part, airpower's underperformance was due to the target set's relative invulnerability. More significant, however, were the air planners' complete underestimation of German aircraft production capability and the industriousness of its people. Thus, today's planners must exercise care when making assumptions about enemy capability *and* will. Third, even when desired effects are objectively measurable, commanders may not be attuned to the assessment process enough to act upon the knowledge. Air planners in World War II clearly recognized air attacks against the ball-bearing and aircraft industries were failing to arrest German fighter production—"production-wastage differential" continued to favor the Germans.[21] Despite signs of this "failure," though, the CBO continued its attacks on aircraft industry. Commanders, then, must not only demand, but also focus on operational assessments—ignoring such assessments prevents the commander from improving the

[19] The United States Strategic Bombing Surveys Summary Report, (Maxwell AFB, AL: Air University Press, 1987), 19.
[20] See McFarland's To Command the Sky for in-depth discussion and analysis of this premise.

campaign's execution.[22] Finally, the CBO teaches just how difficult understanding the causal relationship between military action and effect can be. While one must acknowledge that the CBO ultimately achieved its intermediate objective—gaining air superiority—it did so for reasons the planners never fully understood. Pilot, not aircraft, attrition was the mechanism for success. Counting the number of aircraft destroyed—a measurable, physical effect—was much less meaningful than air planners believed.[23] Today, identifying an effect's cause remains just as difficult, even in cases where the causal relationship seems quite simple. Commanders and staff must engage in persistent critical analysis to help bring clarity to the causal connections and reduce the potential for misidentification. Overall, this CBO example demonstrates the elusive nature of a "perfect" operational assessment. More importantly, though, it shows the assessment capability was adequate to enhance the commander's decisions and judgment—it simply was not used appropriately. Can an analysis of World War II ground operations similarly yield valid lessons about assessment?

As an example, this discussion considers Allied actions during the 1944 breakout operations from Normandy beachhead. As the Allies expanded the breakout to the south, the German Seventh Army launched a counterattack at Mortain, France. The attack was particularly threatening since, if successful, the Germans might sever the Allied lines of supply. General Omar Bradley, the Allied Twelfth Army Group Commander, then, faced two

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[21] McFarland, 170. Admittedly, Allied analysis actually underestimated German fighter production. Still, they clearly recognized that fighter production was increasing despite Allied bombing efforts.

[22] Additionally, commanders must understand the potentially debilitating effects of doctrine. In this example, for instance, it is likely air planners understood the ineffectiveness of their efforts. However, they knew no other way to proceed, since interwar-period airpower doctrine allowed for only two means to gain air superiority—(1) attacks against aircraft on the ground, airfields, and aircraft industry and (2) using the bomber's self-defense capability to defeat any enemy air still flying. See McFarland, page 83.

[23] In reality, then, any bomber sorties in the German homeland would enable pilot attrition, achieving the air superiority effect. Not recognizing this situation prevented air planners from refocusing bombing efforts to more lucrative targets in early 1944—perhaps against the German oil industry. As a result, the CBO, while effective, was not particularly efficient.

choices: (1) play it safe and reinforce the "Mortain Hinge" to ensure the German advance was halted or (2) rely on current defenses at Mortain, continue the exploitation, and seek a battle of annihilation, completely enveloping the German Seventh Army.[24] After considering potential gains and risk, General Bradley chose the later course. Of note, General Bradley was aware of the German preparations for a counterattack. However, he was, of course, unable to leverage the advanced intelligence, surveillance, and reconnaissance capabilities existent today. Even so, his judgment proved correct. As General Eisenhower recognized,

> Bradley's judgment as to his ability to hold the Mortain hinge was amply demonstrated by events but the whole situation is yet another example of the type of delicate decision that a field commander is frequently called upon to make in war.[25]

Assessment limitations, therefore, cannot always be allowed to delay a commander's decisions—at least, not without consequences. Just as in the CBO analysis, commanders necessarily operate in an uncertain environment. Unlike the CBO example, however, General Bradley's decision highlights the value of *long-term, subjective assessments.* Such an assessment enabled him to make the right judgments about friendly and enemy capabilities.

Following this decision, the opportunity for annihilation in fact occurred—the Falaise Encirclement. Though the encirclement was generally successful, it was far short of the annihilation Bradley hoped for—many Germans and much equipment escaped the great Allied pincer movement. Likewise, the Allies failed to complete an even deeper encirclement at the Seine River. In part, this "failure" resulted from Allied fears of friendly fratricide.[26] If, however, the Allies had possessed the capability to accurately know friendly and enemy

[24] Omar N. Bradley, A Soldier's Story, (New York: Henry Holt and Co, 1951), 372.
[25] Dwight D. Einsenhower, Crusade in Europe, (Baltimore: The John Hopkins University Press, 1948), 275.
[26] In "closing the gate" in the encirclement, Allied forces necessarily converged toward each other. Lack of adequate deconfliction capabilities required the Allies to exercise great caution in the maneuver—too much caution to prevent the escape of some German forces.

positions—or as Eisenhower puts it, "if the exact situation could have been foreseen"[27]—the Allies would have undoubtedly faired better, completing the encirclement and perhaps ending the war in Europe sooner. The lesson for today—a real-time collection and assessment capability can be a powerful force multiplier, refining a commander's long-term, subjective assessments.

Operation DESERT STORM serves as the most recent case study for this analysis. The analysis thus leaps forward in history significantly. This broad leap is intentional, however, for this approach dramatically demonstrates how little operational assessment has advanced over a fifty-year period.[28] First, the DESERT STORM example reinforces two lessons from World War II—then addresses two additional assessment challenges.

Similar to General Bradley's Falaise Encirclement, General Norman Schwarzkopf, through his "left hook" concept of operations, sought a battle of annihilation against Iraqi forces. In stark contrast to General Bradley, however, General Schwarzkopf possessed near real-time communications and collection capabilities during the 100-hour ground war. These capabilities, in turn, gave General Schwarzkopf unprecedented situational awareness as to friendly and enemy movements and maneuver. Near instant communications meant he could act on this knowledge. General Schwarzkopf, though, failed to exploit the benefits of these force-multiplying capabilities, allowing Iraqi forces to escape Kuwait. To capitalize on near real-time assessment capabilities, then, a commander must focus collection assets, look for and demand results of such collection, and then exercise command and act on the information.

DESERT STORM also re-emphasizes the problems in the traditionally-favored type of assessment—the assessment of physical effects. General Schwarzkopf directed Coalition

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airpower to destroy 50% of Iraqi armor in the Kuwaiti Theater of Operations—he viewed such attrition as an important condition prior to initiating the ground war. Tracking such a measurable effect should have been simple in the open desert landscape. In practice, however, multiple agencies assessed attrition levels for the commander—and the estimates were wildly inconsistent. The CIA's estimate—perhaps the most influential—was lowest of all, and it called in to question any decision to launch the ground war. In fact, as Schwarzkopf recalls, "if we'd waited to convince the CIA, we'd still be in Saudi Arabia."[29] Interestingly, given all the wrangling over the "armor attrition" count, one might be surprised to realize post-war analyses have questioned this goal's importance. With the benefit of hindsight, the 50% goal for armor attrition was certainly beyond that necessary to meet General Schwarzkopf's acceptable risk. Why? Physical effects, like the destruction of Iraqi tanks, also achieved psychological or behavioral effects. *The Gulf War Air Power Survey (GWAPS) Summary Report* makes this point abundantly clear:

> Ironically, the loss of equipment, a key index of bomb damage assessment used during the war, was not decisive in any direct way. The Iraqi army did not run out of tanks, armored personnel carriers, or artillery; in fact, much of the equipment remaining intact at the start of the ground offensive was abandoned, or was at least unoccupied, when the Coalition ground forces reached it.[30]

Moreover, as respected historian Williamson Murray has observed: "Since the dawn of military air power, airmen have claimed that air power would directly impact enemy morale on and off the battlefield. In the Gulf War they were right . . . "[31] Again, one sees physical effects are not easily measured; they may become quite meaningless over time, or certainly

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[28] Technology has expanded the operational commander's command and control capabilities, reach, maneuver, and firepower, but his challenges with assessment remain remarkably similar to the World War II case.
[29] Schwarzkopf, 432.
[30] Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Survey Summary Report, (Washington, DC: Department of the Air Force, 1993), 117.
[31] Williamson Murray, "Drifting into the Next Century: The USAF and Air Power," Strategic Review, (Summer 1999): 19.

far less meaningful than planners' expectations; and, they may have powerful spillover impact—in this case psychological impact—greatly outweighing the effect's original and envisioned intent. Thus, the clear distinction often made by commanders between "physical" and "other" effects seems overdrawn; physical effects, too, suffer from a lack of fidelity in the assessment process.

The analysis of this *limited-objective* war highlights two additional concepts regarding operational assessment—(1) the rising sensitivity of campaign design to assessment considerations and (2) the inevitable search for the low-risk, rapid, and high-payoff functional and psychological effects. In DESERT STORM, like all major conflicts involving US combat capability since 1991, American objectives were limited, but the political leaders desired an enduring endstate. Specifically, the desired endstate included more than the restoration of a sovereign Kuwait; the war also sought to create long-term regional stability. As such, military plans focused on reducing Iraq's threat to the region and General Schwarzkopf rightly oriented his plan on ejecting Iraqi forces from Kuwait, destroying Republican Guard Forces Command (RGFC), and eliminating weapons of mass destruction (WMD) capability.[32] Unlike the unlimited World War II, however, the Coalition commanders could not occupy the enemy's homeland to methodically assure the accomplishment of all three objectives. The operational commander's challenge, therefore, became one of assessing the success or failure of Coalition efforts "from afar." While any observer could easily judge when the Coalition succeeded in ejecting the enemy force from Kuwait, how could the operational commander determine whether the RGFC and WMD objectives were met? Assessment capabilities, therefore, clearly became critical for the commander—more so than in an unlimited-war

[32] Keaney, 39. See also page 78.

scenario. Unfortunately, the assessment mindset and methodology used in DESERT STORM proved lacking—the Coalition was unsuccessful in meeting its RGFC and WMD goals.

One major reason why the Coalition failed to meet its RGFC and WMD goals was because the commander and staff did not adequately emphasize the requirements, capabilities, and limitations of operational assessment as they designed the campaign. As this paper has already attempted to document, the Coalition might have succeeded in destroying the RGFC if it had properly planned for and focused its near real-time assessment capability during the ground war.[33] Not fully examining the WMD assessment challenge during campaign design resulted in a different problem for the Coalition—the incongruence of political expectations and military capabilities. Admittedly, airpower's anticipated effectiveness against WMD was oversold to campaign planners.[34] Clearly, however, any intellectually-rigorous assessment analysis would have revealed the extreme difficulty in measuring WMD degradation without "boots on the ground." Of course, this revelation—given the political and Coalition constraints of the time—would not have allowed for the occupation of Iraq. It would, however, have harmonized political and military expectations, generated intense discourse about the attendant risk in only partially eliminating Iraq's WMD, and pressed military planners to uncover new approaches—physical, functional, and psychological—for attacking WMD capability. Considering assessment requirements at the *beginning of campaign design*, then, is critical, particularly in a limited-objective war.

[33] In deference to General Schwarzkopf, his campaign adequately planned for the RGFC destruction through his "left-hook" plan. He brilliantly understood that ejecting the enemy from Kuwait and simultaneously destroying that force was exceedingly difficult. For in the limited-war context, once Kuwait was liberated, it was quite possible the political leadership might stop operations before the RGFC was destroyed—Schwarzkopf had to design his campaign correctly to meet both objectives.
[34] Keaney, 79.

Experience in limited conflicts such as DESERT STORM also indicates the relative importance assigned to low-risk, rapid, and high-payoff functional and psychological effects, particularly against the "leadership target." The campaign placed great emphasis on changing behavior in the adversary's regime. Judging the efficacy of such effects, however, proved inherently difficult. In fact, the full impact of these psychological effects remains shrouded in mystery. As the *GWAPS Summary Report* aptly stated:

> Given these generalized effects and related symptoms, did the bombing of [leadership] and [command and control] targets come within a hair of shattering Saddam Hussein's Ba'athist regime, or did it fall well short? On the evidence available to the Survey, no firm answer can be given. Without access to high-level Iraqi officials and records, the degree of disruption and dislocation inflicted by strikes in the [leadership] and [command and control] target categories cannot be quantified, not even roughly. While there were signs that the Iraqi regime was shaken and its telecommunications disrupted, the hoped-for collapse did not occur, and judging how close the Coalition came does not appear possible on the available evidence.[35]

Such effects indeed defied exact measurement—operational assessment of such effects will always be ambiguous.[36] However, this same *GWAPS* excerpt also clearly suggested these psychological effects had positive impact. In fact, this report is more explicit in stating "…few cases in which quantitative measures alone were sufficient to tell more than a part of the broader operational-strategic story."[37] Psychological effects, then, can be powerful force multipliers—and may be vitally important in the limited conflicts facing today's military.[38]

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[35] Ibid, 71.

[36] Some convincingly suggest that psychological effects will never be completely understood. One reason, of course, is the inability, in a severely limited, constrained conflict, to gain access to the adversary's nation-state or his leadership's official records and correspondence, even post-conflict. Secondarily, even when post-war interviews are possible, it is difficult to re-create exactly the impact of any such effects. See Beagle.

[37] Keaney, 117.

[38] This discussion naturally begs the question: Can psychological effects be "war-winning" independently? ALLIED FORCE may not have answered this question directly, but it certainly pointed toward the edge of the envelope for the efficacy of psychological effects. Political constraints allowed only the use of airpower; airpower limits and self-imposed restraints prevented North Atlantic Treaty Organization (NATO) forces from *compelling* the halting of Serbian aggression in Kosovo; and, the theory of victory, therefore, can best be described as attacking Serbia proper, not to destroy Serbia or its infrastructure, but to *coerce* Slobodan Milosevic's compliance with NATO war aims. In other words, the theory of victory relied heavily on psychological effects. By all accounts, success was a close run thing—one may never know why Milosevic complied with NATO desires. Psychological effects, then, are inherently difficult to assess, potentially powerful force multipliers, and best, not as a stand-alone effort, but when integrated in a campaign's design.

Bridging the Operational Assessment Gap—Designing the EBO Campaign

Ideally, at this point, future JFCs should have a new perspective on EBO and operational assessment, shaped by five concepts. *First, JFCs must acknowledge the potential in exploiting EBO fully—including the physical, functional, and psychological dimensions.* Physical effects have proven elusive in providing the anticipated clarity for the commander; moreover, "hard-to-measure" functional or psychological effects have contributed to success. *Second, JFCs must not retard progress toward EBO campaigns because of a perceived "assessment gap."* Assessment indeed remains incapable of eliminating uncertainty—but this is not different than any time in history. *Third, JFCs must recognize that commanders throughout history have generally been inattentive to operational assessment—this trend must be reversed.* Past commanders failed to synchronize collection assets with assessment requirements, to demand—much less critically analyze—available assessments, and to consider assessment during campaign design. *Fourth, JFCs should appreciate the complexity inherent in operational assessment, particularly in understanding causal linkages.* Such complexity demands a new staff function to support the JFC's assessment requirements. *Fifth, JFCs must view operational assessment as a critical operational art consideration during campaign design, execution, and post-hostilities analysis—not just the latter.* Institutionalizing these perspectives on operational assessment requires formal action, development of a useful conceptual framework, and commander involvement.

Three formal actions—in this case, amendments to joint doctrine—are recommended. First, the joint community should adopt the term *operational assessment* as defined herein—it develops the critical mindset shift necessary for change. Second, Chapter II of JP 3-0 currently recommends that operational commanders consider a series of five questions during

campaign design.[39] These questions, as written, fail to emphasize operational assessment—thus, the first two questions should be modified to read (changes are italicized for emphasis):

- What military (or related political and social) conditions must be produced in the operational area to achieve the strategic goal *and what criteria suggest those conditions have been met*?

- What sequence of actions is most likely to produce that condition *and how can the efficacy of those actions be continually assessed*?

Re-crafting these questions in this manner emphasizes the importance of operational assessment during campaign design, execution, *and* post-war analysis. Finally, Chapter IV of JP 3-0 should reinforce this mindset by adding operational assessment to its recommendations for "considerations *before* combat" and "considerations at the *outset* of combat."[40]

Even with those formal actions in place, JFCs and staffs require a conceptual framework for integrating operational assessment into campaign development and execution. And, as with all operational art, any useful framework inherently stresses "how" to think and not "what" to think—it is far from prescriptive. In this spirit, then, this work recommends a four-step framework: *analysis to identify desired effects, including obtaining political-military agreement on the temporal dimension of those effects; development of an objective and subjective measure concept; employment of a bounding approach to the assessment process, maintaining focus on the commander's decision-making requirements; and, efforts to modify campaign design so as to enhance assessment capabilities or mitigate assessment limitations.* Figure 1 depicts the entire process; examples of each step's application can be found in the expanded notes.

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[39] Joint Publication 3-0, II-3.

[40] Specifically, Figure IV-1 in JP 3-0 should include a new bullet—"Design campaign congruent with operational assessment requirements, capabilities, and limitations." Figure IV-2 in JP 3-0 should include a new bullet—"Optimizing Operational Assessment Capability." The accompanying discussion, of course, would necessarily expand this concept. Detailing the language is beyond the scope of this work.

As always, operational commanders determine the military conditions necessary to meet political guidance. But the first critical step in striving for the most efficacious campaign is to think beyond *objectives* and consider *effects.*[41] Inevitably, this approach yields multiple pathways toward the successful accomplishment of a given effect—physical, functional, and psychological pathways are likely.[42] Following this analysis, each pathway should be assessed against temporal requirements—requirements agreed to by political leaders. This step asks, "Must the effect be permanent or only temporary?" Ultimately, this consideration ensures the JFC's campaign plan begins in harmony with the desired political endstate. Finally, this first step validates each action is acceptable (in terms of risk), feasible, and in concert with any constraints and restraints. Step one, then, identifies effects that are both congruent with political objectives and offer potential from a military perspective.

[41] In framing the campaign's objectives, the commander and staff are simply defining the *outcome* that must be accomplished in the operational area. In identifying desired effects, on the other hand, the JFC and staff expand their analysis to consider not only the outcome but also the possible *causal mechanisms* to that outcome. Such an analysis also stresses both *enemy capabilities* and *enemy will or behavior.*

[42] For example, the CBO in World War II sought to achieve the *effect* of air superiority (or, some would consider the effect better stated as "providing friendly forces freedom of maneuver"). Multiple *actions* were attempted—destroying ball-bearing factories, destroying aircraft industries, achieving attrition through aerial combat—and each had a different notion of the *causal mechanism* for success—respectively, destroying spare parts, destroying production capability, destroying aircraft in the air.

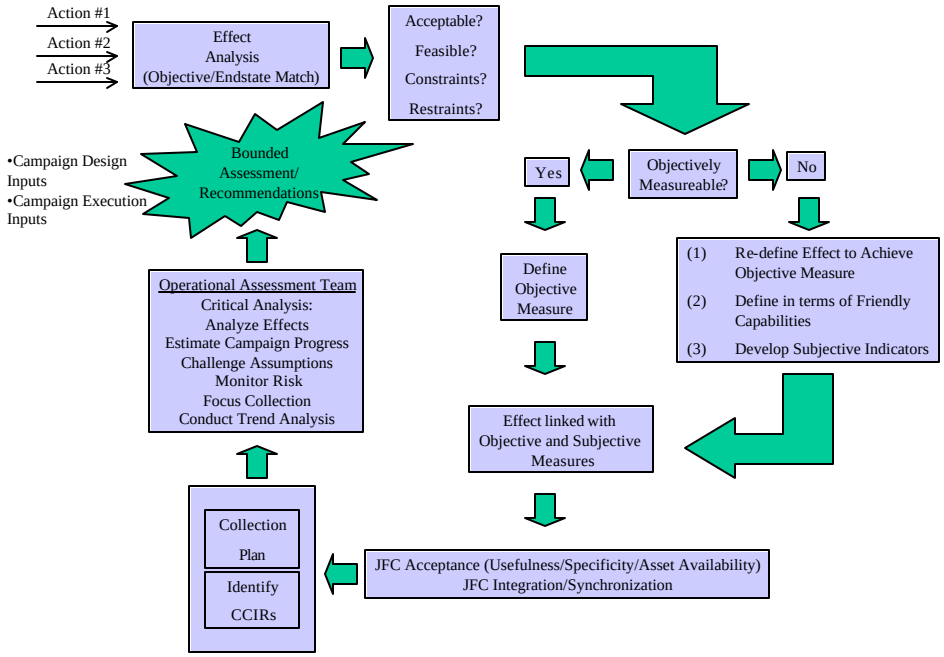

Figure 1: Operational Assessment Framework

Step two focuses on designing an assessment scheme for each desired effect. Its purpose is to define assessment criteria, align assessment capabilities to fill those requirements, and orient the JFC on the key assessments for his future decision-making. To begin, the staff determines whether an effect is measurable with objective criteria. For effects meeting this criterion, the measure is clearly documented. On the other hand, effects defying objective measure are further analyzed to create a valid measurement approach. The staff may consider three approaches: (1) re-define the effect so as to allow an objective measure; (2) define the measure in terms of friendly capability rather than enemy capability; or (3) develop subjective *indicators*.[43] *Indicators, herein, are defined as any actions or inactions by*

[43] One should select the first approach only rarely and with extreme caution—for this approach potentially results in the masking of an important effect. For instance, an often sought-after effect is to "deny an adversary a coherent operational picture of the battlespace." Using the first approach, the staff cannot determine an appropriate measure, so they redefine the effect to include such things as "destroy enemy ground controlled intercept radars" and "destroy enemy operations centers." Such effects can be measured in terms of "things destroyed," yet such assessments, at a minimum, provide the JFC little insight into the original and intended

the adversary that may indicate the success of a particular causal mechanism.[44] In the end, the ideal "measurability analysis" results in defining every effect with *both* objective measures and subjective indicators.[45] Most certainly, some effects fair poorly in this analysis. Effects whose scheme fails to meet JFC requirements for usefulness or specificity may be completely discarded or only considered for implementation in cases of robust asset availability. JFCs now have sufficiently defined the promising effects and can begin the process of integrating and synchronizing effects and forces.

In performing this last step, the JFC and staff have also identified assessment requirements—and thus, provided focus to the in-theater collection manager and the Commander's Critical Information Requirements process. Successful and timely operational assessment, however, also requires continuous critical analysis. To meet these demands, the JFC needs an Operational Assessment Team. As Figure 1 indicates, this team performs tasks such as analyzing effects, estimating campaign progress, and monitoring current risk level. Ultimately, however, this team's purpose is to enhance the operational commander's judgment and decisions about the military campaign's effectiveness and attendant risk in progressing toward the military endstate. To accomplish this purpose, the operational assessment team must develop both an assessment methodology and presentation format

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effect; such an approach also likely wastes assets on secondary efforts. In contrast, the second method represents a powerful technique. In essence, this method recognizes that an effect not only "does something" to the enemy, it also enables friendly action. For instance, if one wanted to "measure air superiority," rather than counting aircraft destroyed or number of enemy sorties—probably meaningless numbers—one might prefer to measure the degree to which friendly sorties or land and sea maneuver was affected by enemy air. The third technique also works well for some effects. For example, a JFC desires to cut-off an adversary's secure communications (via landline and fiber optics). While difficult to assess objectively or directly, one indicator of success might be the sudden increase in the adversary's use of exploitable communications.

[44] Possible sources of indicators are enemy doctrine or the conduct of enemy forces in past conflicts. Planners should exercise caution not to succumb to mirror imaging during the development of indicators.

[45] Success or failure in achieving air superiority might be judged in terms of "number of enemy aircraft destroyed" [objective measure], "the degree to which friendly freedom of maneuver is affected by enemy air" [defining the measure in terms of friendly capability], and "the degree to which preparations are being made for airfield abandonment/aircraft retrograde" [subjective indicator].

suitable to the JFC. Developing this assessment and providing recommendations to the JFC represents step three in this process.

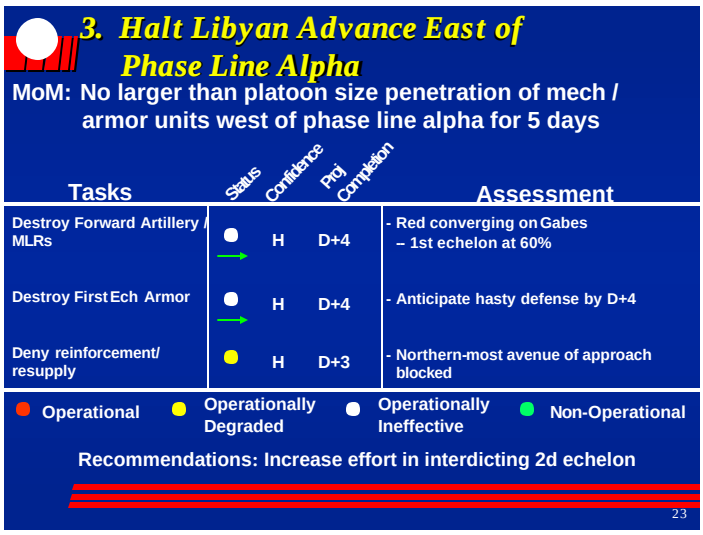
Not surprisingly, methodology represents the most challenging element of operational assessment. One fundamental concept, however, underpins this recommendation—a preference for *bounding* rather than *determinism*.[46] As the name implies, bounding involves more art than science. Still, three bounding methodologies offer significant promise and provide structure to the assessment process: (1) the confidence/risk framework; (2) the most-likely, best-case, worst-case framework; and, (3) the probability framework.

The author developed the "confidence/risk approach" in 1997 for use by Joint Force Air Component Commanders (JFACC) as an alternative to the inadequate "percentage-of-task-completion" format then in use—percentages were not suitable for many desired effects. The "confidence/risk" framework benefited JFACCs by emphasizing the staff's *subjective* assessment, its confidence level in making such an assessment, and any risk in accepting the staff's judgment.[47] Of all approaches, it is the least rigorous but most responsive.

[46] Bounding attempts to define its assessment within a range of possible meaning—that is, the answer lies somewhere between points A and B. Determinism seeks to provide the solution—that is, the answer is A. The bounding method is superior to a deterministic approach for at least two reasons. First, and most obviously, the deterministic or "right answer" approach is wholly infeasible—not only is the assessment process too uncertain to predict exact results, but only the most supremely confident staff could be expected to even try to succeed with such specificity. Second, and more importantly, a bounding methodology, while recognizing the inherent ambiguity of operational assessment, still provides the JFC a useful decision-making framework from which to base his own judgment about a campaign's progress. Moreover, it encourages the JFC and staff to engage in detailed dialogue involving objective and subjective assessments and the rationale for such assessments.

[47] Here is an example of the "confidence/risk" method and its presentation format:

The other two methods are analytically-based techniques and vastly more complex.[48] Both approaches, in current form, offer excellent decision aids during deliberate planning, but struggle to meet the tempo demands of combat operations. On-going research, however, can make these techniques relevant to JFCs in the near-term. The "most-likely, best-case, worst-case" method examines each action, and—based on knowledge, modeled past experience, and assumptions—predicts the most-likely, best-case (upside), and worst-case (downside or risk) outcomes. Such an approach has wide application and provides superb decision boundaries for the JFC; it is also intensive in its requirements and dependent on already-modeled data. The last method—the probability method—has both the most deterministic flavor and narrow applicability of the three approaches. With this approach, each action is assigned a "probability of success" in achieving the desired effect. Unlike the "percentage method" discussed above, however, this method uses detailed modeling in predicting probabilities. It is most useful for effects that target *networked* enemy systems such as transportation, electrical power, and telecommunications. The probability represents the likelihood an action will achieve the desired level of degradation against these systems. Again, this method is



superb in the ideal circumstance; but it is too cumbersome when extensive exploitation of the enemy system is either not modeled or not available. Neither of these later approaches, then, is fully developed. Yet, even in their relative immaturity, these concepts are invaluable in pushing future solutions toward bounding rather than determinism. JFCs should enthusiastically support efforts to advance these analytical frameworks.

Using this bounded analysis, the operational assessment team provides the commander recommendations for campaign design *before* and *during* combat operations. Recommendations during combat necessarily focus on the campaign's progress— "accelerate a phase shift," "change the weight of effort for objective alpha," or "execute a branch plan" are representative examples. More significantly for this paper, however, is the operational assessment team's influence during campaign design. By considering assessment from a plan's inception and conducting the detailed analysis outlined in this paper, the JFC and staff, through the assessment team, develop considerable insight into actions, causal mechanisms, and effects that support mission accomplishment. Importantly, this process serves to highlight for the JFC and staff the key challenges in sustaining a campaign's progress. What effects are most difficult to achieve? What effects defy assessment?

Why does this make a difference? In this case, the JFC now has a process that spotlights critical uncertainty. In identifying the areas of uncertainty that matter most, the JFC and staff can search for ways to eliminate, mitigate, or plan for—with branches and sequels—this uncertainty before the campaign commences. Prudent options or "workarounds" available to the JFC are: planned operational pauses, comprehensive sequel schemes, and built-in redundancy. Circumstances and JFC preference dictate which approach

[48] For detailed information on these analytical assessment methods, see Paul K. Davis, Effects-Based Operations: A Grand Challenge for the Analytical Community.

makes the most sense.[49] All of these "workaround" methods are well-known—rarely, however, are they planned for so early in a campaign design. Accomplishing the process, then, rewards the JFC and staff with a campaign plan that: (1) better anticipates the key uncertainties and potential challenges ahead and (2) plans effectively to overcome or "workaround" the uncertainty. Only by the previous hard work and thinking required by this proposed process can a staff prepare a JFC so well for possible challenges.

Conclusion

The "assessment gap"—the inability to measure effects in war precisely—is often considered the major hurdle preventing progress toward the planning and execution of EBO campaigns. As such, much joint effort focuses on eliminating this gap, pursuing technological solutions as a means to reduce uncertainty. Yet, this paper makes a compelling case that judging the success or failure of effects in war—whether physical, functional, or psychological—defies clarity and certainty; and, if history portends the future at all, it will remain so, even with Herculean technological efforts. More worthwhile, then, are efforts that focus on working through the enduring assessment challenges for the JFC. Several recommendations in this paper can contribute mightily to this goal. Most important among these recommendations are: (1) developing a new operational assessment concept, oriented on the JFC's decision-making needs; (2) changing doctrine so that it encourages assessment

[49] A JFC might consider each of the proposed "workarounds"—planned operational pauses, comprehensive sequel schemes, and built-in redundancy—as follows. If a particular effect is of secondary importance, a JFC may elect to execute the military action and allow a significant time period for his staff to judge the effects—that is, a JFC may find an operational pause beneficial before changing his plan. On the other hand, effects of primary importance may require the JFC to be less patient. The JFC and staff, however, benefiting from the detailed pre-execution analysis, would have already developed the backup plan—the sequel—and even decided how long to wait before executing the sequel. Detailed planning for critical uncertainty allows graceful modification to a campaign in execution. In other cases, primary, but highly uncertain effects may force the JFC and staff to build a campaign with planned redundancy. At least two options are available—a JFC may choose to plan multiple "attacks" against the same "target" using the same causal pathway; or alternatively, he may elect

considerations to become a key influence on campaign design and execution; and, (3) establishing a detailed assessment framework that favors a bounded methodology. Clearly, operational assessment is as challenging as any facet of operational art. Following these recommendations, however, will allow future JFCs to design potent EBO campaigns, regardless of the ever-present uncertainty; ignoring these recommendations, on the other hand, will likely mean that assessment remains the Achilles heel of EBO.

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to "attack" along multiple pathways toward the effect, perhaps combining physical, functional, and psychological methodologies.

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